

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for processing databases in a system which includes a plurality of storage areas each storing a database and a plurality of computers each having a database management program (DBMS) running thereon which manages one of said plurality of storage areas, each said storage area being associated with only said DBMS managing said storage area and being accessed by only said DBMS, said comprising a plurality of storage areas and a plurality of computers, wherein a first computer in the plurality of computers has running thereon a first database management program (DBMS) configured to manage a first storage area in the plurality of storage areas, wherein a second computer in the plurality of computers has running thereon a second DBMS configured to manage a second storage area in the plurality of storage areas, and wherein the first and second DBMSs are configured to run concurrently, the method comprising:

receiving a request to access the first storage area, the request being directed to the first DBMS running on the first computer; and

when a failure has occurred in one of said plurality of computers as a failed computer at the first computer;[[,]]

obtaining preset substitution information including an association between the first DBMS and the second DBMS, wherein the association indicating indicates that a storage area managed by a DBMS running on said failed computer is to be managed and accessed by a DBMS already running on another one of said plurality of computers as a substitute DBMS the second DBMS is to manage the first storage area in addition to the second storage area; and

based on said the preset substitution information, changing association of said storage area with said DBMS on said failed computer to said substitute DBMS, said storage area to be managed by said substitute DBMS already running on said another computer sending

the request to the second DBMS running on the second computer, wherein the second DBMS is configured to access the first storage area and process the request.

2. (Currently Amended) The method as recited in claim 1, wherein ~~said substitution information includes association information associating~~ the association includes an identifier of ~~said the first DBMS running on said failed computer with~~ and an identifier of ~~said substitute the second DBMS already running on said another computer, said substitution information indicating that said storage area managed by said DBMS running on said failed computer is to be managed by said substitute DBMS already running on said another computer when a failure occurs.~~

3. (Currently Amended) The method as recited in claim ~~[[2]]~~ 1, wherein ~~said the preset substitution information comprises a mutual substitution configuration in which two of the DBMSs are associated with one another whereby one of the two DBMSs is a substitute DBMS for the other of the two DBMSs as a failed DBMS mutually~~ includes another association between the first DBMS and the second DBMS, said another association indicating that the first DBMS is to manage the second storage area in addition to the first storage area.

4. (Currently Amended) The method as recited in claim ~~[[2]]~~ 1, wherein ~~said the preset substitution information comprises a substitution configuration in which a group of [[the]] DBMSs from a first DBMS to a last DBMS are associated with each other in a manner whereby a~~ such that the first DBMS is a substitute DBMS to manage a storage area for a second DBMS, which is a substitute DBMS the second DBMS is to manage a storage area for a third DBMS, and the last DBMS is a substitute DBMS is to manage a storage area for the first DBMS.

5. (Currently Amended) The method as recited in claim ~~[[2]]~~ 1, wherein ~~said the preset substitution information comprises an n-to-1 substitution configuration whereby one of the DBMSs one DBMS is a substitute DBMS for n of the DBMSs as failed DBMSs~~ is to manage storage areas for n other DBMSs.

6 - 11. (Canceled)

12. (Currently Amended) A system for processing databases, said system comprising:

a plurality of storage areas, each storage area including storing a database; and
a plurality of ~~computers~~ back end servers, each having a database management program (DBMS) running thereon which manages one of said plurality of storage areas, each said storage area being associated with only said DBMS managing said storage area and being accessed by only said DBMS including a first back end server and a second back end server, wherein the first back end server has running thereon a first database management program (DBMS) configured to manage a first storage area in the plurality of storage areas, wherein the second back end server has running thereon a second DBMS configured to manage a second storage area in the plurality of storage areas, and wherein the first and second DBMSs are configured to run concurrently; and

a front end server configured to:

receive a request to access the first storage area, the request being directed to the first DBMS running on the first computer; and

wherein each DBMS includes a substitution control section configured, when a failure has occurred in one of said plurality of computers as a failed computer, to at the first computer:

obtain preset substitution information including an association between the first DBMS and the second DBMS, wherein the association indicating indicates that a storage area managed by a DBMS running on said failed computer is to be managed by a DBMS already running on another one of said plurality of computers as a substitute DBMS the second DBMS is to manage the first storage area in addition to the second storage area; and[[,]]

based on said the preset substitution information, to change association of said storage area with said DBMS on said failed computer to said substitute DBMS, said storage area to be managed and accessed by said substitute DBMS on said another

~~computer~~ send the request to the second DBMS running on the second computer, wherein the second DBMS is configured to access the first storage area and process the request.

13. (Currently Amended) The system as recited in claim 12, wherein ~~said substitution information includes association information associating~~ the association includes an identifier of said ~~the first DBMS running on said failed computer with~~ and an identifier of said ~~substitute the second DBMS already running on said another computer, said substitution information indicating that said storage area managed by said DBMS running on said failed computer is to be managed by said substitute DBMS already running on said another computer when a failure occurs.~~

14. (Currently Amended) The system as recited in claim ~~[[13]]~~ 12, wherein ~~said the preset substitution information comprises a mutual substitution configuration in which two of the DBMSs are associated with one another whereby one of the two DBMSs is a substitute DBMS for the other of the two DBMSs as a failed DBMS mutually~~ includes another association between the first DBMS and the second DBMS, said another association indicating that the first DBMS is to manage the second storage area in addition to the first storage area.

15. (Currently Amended) The system as recited in claim ~~[[13]]~~ 12, wherein ~~said the preset substitution information comprises a substitution configuration in which a group of [[the]] DBMSs from a first DBMS to a last DBMS are associated with each other in a manner whereby a~~ such that the first DBMS is a substitute DBMS to manage a storage area for a second DBMS, which is a substitute DBMS the second DBMS is to manage a storage area for a third DBMS, and the last DBMS is a substitute DBMS is to manage a storage area for the first DBMS.

16. (Currently Amended) The system as recited in claim ~~[[13]]~~ 12, wherein ~~said the preset substitution information comprises an n-to-1 substitution configuration whereby one of the DBMSs~~ one DBMS is a substitute DBMS for n of the DBMSs as failed DBMSs to manage storage areas for n other DBMSs.

17 - 33. (Canceled)

34. (Previously Presented) A method for processing databases in a system comprising a processing request receiving server, a plurality of storage areas, and a plurality of database access servers, wherein each storage area in the plurality of storage areas includes as least one database, and wherein each database access server in the plurality of database access servers is associated with a storage area in the plurality of storage areas, thereby enabling said each database access server to manage and access its associated storage area, the method comprising:

when a failure has occurred in a first database access server in the plurality of database access servers, obtaining preconfigured substitution information identifying a mapping between the first database access server and a second database access server in the plurality of database access servers, wherein the first and second database access servers are distinct;

based on the preconfigured substitution information, re-associating a storage area associated with the first database access server such that the storage area becomes associated with the second database access server, thereby enabling the second database access server to manage and access the storage area;

receiving a processing request directed to a target database access server in the plurality of database access servers, the processing request being received by the processing request receiving server;

determining whether the target database access server is in operation;

if the target database access server is in operation, forwarding the processing request to the target database access server, wherein the target database access server is configured to process the forwarded processing request;

if the target database access server is not in operation:

determining a substitute database access server for the target database access server based on the preconfigured substitution information;

modifying the processing request to include a substitution instruction; and

transmitting the modified processing request to the substitute database access server, wherein the substitute database access server is configured to identify the substitution instruction in the modified processing request, obtain execution environment information for the target database access server, switch an execution environment of the substitute database access server to that of the target database access server based on the execution environment information, and process the processing request on behalf of the target database access server.

35. (Previously Presented) The method of claim 34, wherein the mapping associates an identifier of the first database access server with an identifier of the second database access server, the mapping indicating that a storage area associated with the first database access server is to be associated with the second database access server when a failure occurs in the first database access server.

36. (Previously Presented) The method of claim 35, wherein the mapping further indicates that a storage area associated with second database access server is to be associated with the first database access server when a failure occurs in the second database access server.

37. (Previously Presented) A system for processing databases, the system comprising:

- a processing request receiving server;
- a plurality of storage areas, each storage area including at least one database; and
- a plurality of database access servers, each database access server being associated with a storage area in the plurality of storage areas, thereby enabling said each database access server to manage and access its associated storage area,

wherein the processing request receiving server is configured to:

- receive a processing request directed to a target database access server in the plurality of database access servers;

determine whether the target database access server is in operation;
if the target database access server is in operation, forward the processing request to the target database access server, wherein the target database access server is configured to process the forwarded processing request;
if the target database access server is not in operation:
determine a substitute database access server for the target database access server based on preconfigured substitution information;
modify the processing request to include a substitution instruction;
and
transmit the modified processing request to the substitute database access server, wherein the substitute database access server is configured to identify the substitution instruction in the modified processing request, obtain execution environment information for the target database access server, switch an execution environment of the substitute database access server to that of the target database access server based on the execution environment information, and process the processing request on behalf of the target database access server.

38. (Previously Presented) The system of claim 37, wherein the preconfigured substitution information includes a mapping associating an identifier of the target database access server with an identifier of the substitute database access server, the mapping indicating that a storage area associated with the target database access server is to be associated with the substitute database access server when a failure occurs in the target database access server.

39. (Previously Presented) The system of claim 38, wherein the mapping further indicates that a storage area associated with substitute database access server is to be associated with the target database access server when a failure occurs in the substitute database access server.

40. (New) A method for processing databases in a system comprising a plurality of storage areas and a plurality of computers, wherein a first computer in the plurality of computers has running thereon a first database management program (DBMS) configured to manage a first storage area in the plurality of storage areas, wherein a second computer in the plurality of computers has running thereon a second DBMS configured to manage a second storage area in the plurality of storage areas, and wherein the first and second DBMSs are configured to run concurrently, the method comprising:

receiving a request to access the first storage area, the request being directed to the first DBMS running on the first computer; and

when a failure has occurred at the first computer:

obtaining preset substitution information including an association between the first DBMS and the second DBMS, wherein the association indicates that the second DBMS is to manage the first storage area in addition to the second storage area; and

based on the preset substitution information, sending the request to the second DBMS running on the second computer, wherein the second DBMS is configured to access the first storage area and process the request,

wherein the preset substitution information includes a plurality of associations between DBMSs, each association including priority information indicating a priority of said each association with respect to other associations.

41. (New) A system for processing databases, said system comprising:
a plurality of storage areas, each storage area including a database;
a plurality of back end servers including a first back end server and a second back end server, wherein the first back end server has running thereon a first database management program (DBMS) configured to manage a first storage area in the plurality of storage areas, wherein the second back end server has running thereon a second DBMS configured to manage a second storage area in the plurality of storage areas, and wherein the first and second DBMSs are configured to run concurrently; and

a front end server configured to:

receive a request to access the first storage area, the request being directed to the first DBMS running on the first computer; and

when a failure has occurred at the first computer:

obtain preset substitution information including an association between the first DBMS and the second DBMS, wherein the association indicates that the second DBMS is to manage the first storage area in addition to the second storage area; and

based on the preset substitution information, send the request to the second DBMS running on the second computer, wherein the second DBMS is configured to access the first storage area and process the request,

wherein the preset substitution information includes a plurality of associations between DBMSs, each association including priority information indicating a priority of said each association with respect to other associations.

42. (New) A method for processing databases in a system comprising a processing request receiving server, a plurality of storage areas, and a plurality of database access servers, wherein each storage area in the plurality of storage areas includes at least one database, and wherein each database access server in the plurality of database access servers is associated with a storage area in the plurality of storage areas, thereby enabling said each database access server to manage and access its associated storage area, the method comprising:

when a failure has occurred in a first database access server in the plurality of database access servers, obtaining preconfigured substitution information identifying a mapping between the first database access server and a second database access server in the plurality of database access servers, wherein the first and second database access servers are distinct;

based on the preconfigured substitution information, re-associating a storage area associated with the first database access server such that the storage area becomes associated with the second database access server, thereby enabling the second database access server to manage and access the storage area;

receiving a processing request directed to a target database access server in the plurality of database access servers, the processing request being received by the processing request receiving server;

determining whether the target database access server is in operation;

if the target database access server is in operation, forwarding the processing request to the target database access server, wherein the target database access server is configured to process the forwarded processing request;

if the target database access server is not in operation:

determining a substitute database access server for the target database access server based on the preconfigured substitution information;

modifying the processing request to include a substitution instruction; and

transmitting the modified processing request to the substitute database access server, wherein the substitute database access server is configured to identify the substitution instruction in the modified processing request, obtain execution environment information for the target database access server, switch an execution environment of the substitute database access server to that of the target database access server based on the execution environment information, and process the processing request on behalf of the target database access server,

wherein the preconfigured substitution information includes a plurality of mappings between database access servers, each mapping including priority information indicating a priority of said each mapping with respect to other mappings.

43. (New) A system for processing databases, the system comprising:

a processing request receiving server;

a plurality of storage areas, each storage area including at least one database; and

a plurality of database access servers, each database access server being associated with a storage area in the plurality of storage areas, thereby enabling said each database access server to manage and access its associated storage area,

wherein the processing request receiving server is configured to:

receive a processing request directed to a target database access server in the plurality of database access servers;

determine whether the target database access server is in operation;

if the target database access server is in operation, forward the processing request to the target database access server, wherein the target database access server is configured to process the forwarded processing request;

if the target database access server is not in operation:

determine a substitute database access server for the target database access server based on preconfigured substitution information;

modify the processing request to include a substitution instruction;

and

transmit the modified processing request to the substitute database access server, wherein the substitute database access server is configured to identify the substitution instruction in the modified processing request, obtain execution environment information for the target database access server, switch an execution environment of the substitute database access server to that of the target database access server based on the execution environment information, and process the processing request on behalf of the target database access server,

wherein the preconfigured substitution information includes a plurality of mappings between database access servers, each mapping including priority information indicating a priority of said each mapping with respect to other mappings.